

Low-Viscosity Lubricants

A Glance at Clean Freight Strategies

Synthetic lubricants in the engine crankcase, rear axle, and transmission can improve fuel economy by about 3 percent, saving nearly 485 gallons of fuel and eliminating 5 metric tons of greenhouse gas emissions for a typical combination truck each year.

What is the challenge?

Lubricants reduce friction and wear of critical vehicle systems including the engine, transmission and drive train. Without lubricants, the moving parts inside these systems would grind together, causing heat, stress and wear. Conventional mineral oil lubricants may have too high viscosity (internal friction that resists sliding and inhibits flow) to effectively slip between and lubricate the moving parts of these systems, particularly in newer truck components that are designed with close tolerances and tight fits. Conventional lubricants may also be heavy, making it harder for pumps, gears and shafts to move. These effects create energy losses and friction losses, and waste fuel.

What is the solution?

Low-viscosity lubricants are less resistant to flow than conventional lubricants, a property that helps reduce friction and energy losses. Depending upon the application, low-viscosity lubricants may also contain additives designed to withstand the extreme pressure (EP) that could occur as the lubricant flows between tight-fitting parts. Low-viscosity lubricants may be made from synthetic or mineral oil blends with low-viscosity and EP additives. Manufacturers generally offer low-viscosity blends as “fuel economy” lubricants, since the fuel-saving potential of these products is significant. A national trucking association reports that synthetic transmission and axle lubricants can improve fuel economy by 0.5 percent in the summer and 2 percent in the winter (viscosity is temperature-dependent.) A paper published by a professional engineering society found that synthetic engine and transmission lubricants could improve fuel economy by 5 percent, with greater gains at lower speeds. Another paper from this same organization reports that synthetic gear lubricants can improve fuel economy by about 3 percent. European research demonstrates a 3 to 5 percent gain in truck fuel economy using low friction engine lubricants and a 1 to 4 percent gain using low friction transmission lubricants.

Synthetic and semi-synthetic lubricants typically cost more than conventional mineral oil lubricants. Truck service stations suggest that semi-synthetic oils cost about 50 percent more than conventional mineral oils. However, for most trucks, the fuel cost savings generally outweigh the higher product cost. Furthermore synthetic lubricants may extend the interval between lubricant changes therefore further reducing costs of truck fleets.

Energy and Fuel Savings

Gallons Saved
=
485 gallons

CO2 Savings
=
4.93 Metric tons

New MPG
(from 6.0 mpg)
=
6.18 mpg

Fuel Cost Savings
=
\$1,680



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Next Steps

1 Trucking companies should consider using low-viscosity lubricants to improve fuel economy. Synthetic oils are compatible with most truck systems, save fuel, and should provide net cost savings.

2 Before switching lubricants, trucking companies should ensure that the product suits the intended application. Always check manufacturer specifications before switching engine, transmission or drive train lubricants.

3 Consult the manufacturer's vehicle and parts owner manuals and service manuals for information and recommendations on lubrication specifications and procedures. Lubricating oil manufacturers and lubrication guides can provide information about product applications.

4 Trucking associations, equipment manufacturer associations and trucking industry publications may provide additional information and case studies about the benefits and uses of various lubricants.

Savings and Benefits

The combined effect of low-viscosity synthetic engine oils and drive train lubricants can improve fuel economy by at least 3 percent, saving nearly 485 gallons of fuel per year for a typical combination truck. Even with the higher cost of the synthetic oil, truck owners can save more than \$1,680 in fuels per year. Additional cost savings may be possible due to reduced wear and maintenance. Switching to low-viscosity lubricants will reduce greenhouse gas emissions by 4.93 metric tons per year for each truck.